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**Notice of Allowability**

Application No.

10/709,469

Applicant(s)

HUANG ET AL.

Examiner

David Nhu

Art Unit

2818

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6/7/05.
2. ☒ The allowed claim(s) is/are 1-23.
3. ☒ The drawings filed on 07 June 2005 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |



### **REASONS FOR ALLOWANCE**

1. Claims 1-23 are allowed.
2. The following is an examiner's statement of reasons for allowance: None of the references of record teaches or suggests as cited in claims 1, 15: forming a first gate and a second gate beside respective sidewalls of the trench wherein the first gate and the second gate are at a distance from each other and expose a portion of the first dielectric layer at a bottom of the trench; removing a portion of the passivation layer, the second dielectric layer and the first dielectric layer to expose a substrate surface at the bottom of the trench; performing a etching back process so that a top section of the conductive layer is at a level higher than an upper surface of the liner layer but lower than an upper surface of the mask layer; forming a pair of spacers on respective sidewalls of the trench so that a portion of the conductive layer is covered; removing a portion of the conductive layer using the spacers and the mask layer as an etching mask to form a first floating agte on the respective sidewalls of the trench; removing portions of the passivation layer, the first inter-gate dielectric layer and the tunneling oxide layer until a portion of the substrate at the bottom of the trench is exposed; forming a control gate that completely fills the trench, wherein a top section of the trench control gate is at a level higher than a top section of both the first floating gate and the second floating gate.
3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

**Conclusion**

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Mei et al (6,130,453): Flash Memory Structure with Floating Gate in Vertical Trench.

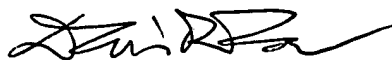
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM.

The examiner's supervisor, David Nelms can be reached on (571)272-1787.

*The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.*

*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956*

David Nhu



June 17, 2005

**DAVID NHU**  
**PRIMARY EXAMINER**

DN  
approved  
6/17/05

## REPLACEMENT SHEET

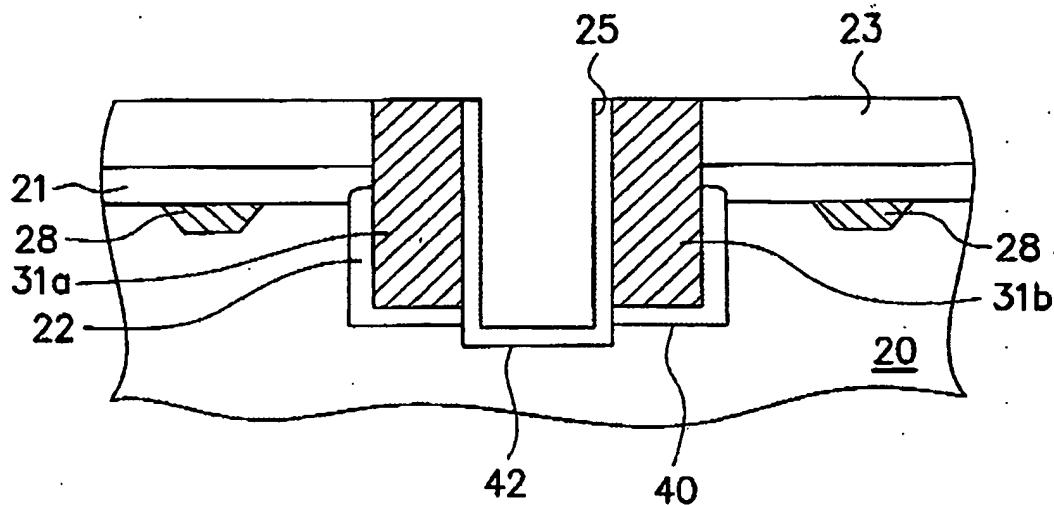


FIG. 2C(PRIOR ART)

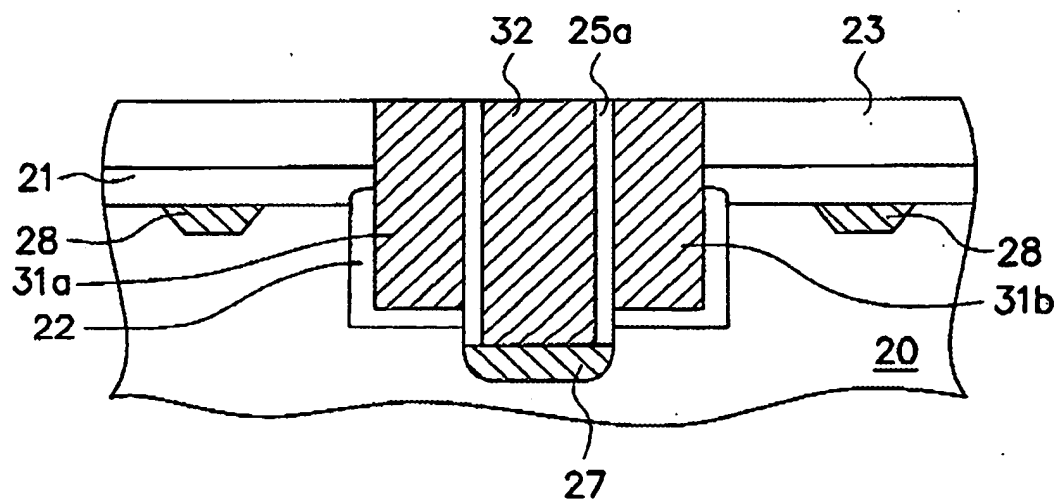


FIG. 2D(PRIOR ART)

## REPLACEMENT SHEET

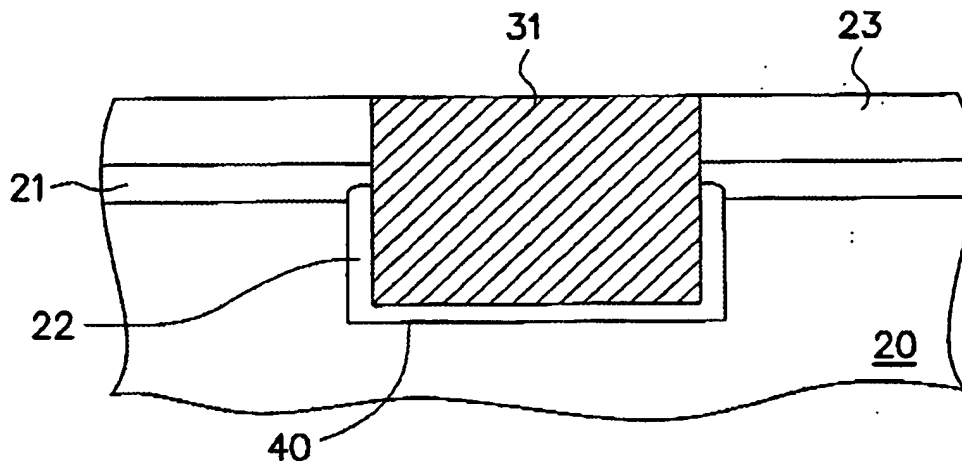


FIG. 2A(PRIOR ART)

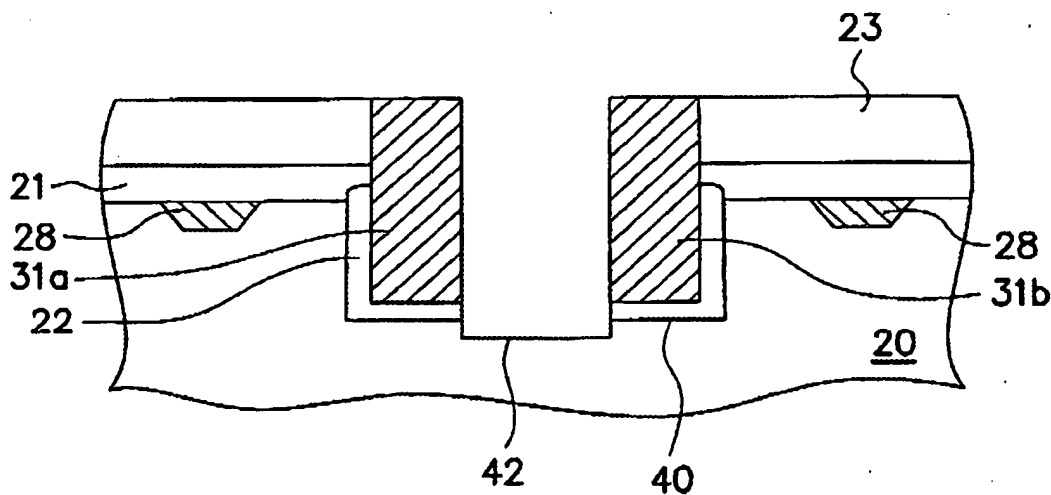


FIG. 2B(PRIOR ART)